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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,497	02/28/2002	Geun-Young Yeom	YPL-0027	2173

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EXAMINER
ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,497	YEOM ET AL.	
	Examiner	Art Unit	
	Luz L. Alejandro	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 16-18* is/are pending in the application.

4a) Of the above claim(s) *4* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7 and 16-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Applicant's election of species A with traverse is acknowledged. The traversal is on that some of the claims, specifically claims 1-2, 5-7, and 17-18 are generic to both species A and B. The examiner agrees with this statement by applicant and submits that claims 1-3, 5-7, and 16-18 will be examined in the instant application since claims 3 and 16 are directed to the elected specie A. However, claim 4 is directed to specie B and will be held to be non-elected and will not be examined unless a generic claim is found allowable, since the species are patentably distinct.

Therefore, this argument is not deemed persuasive and the restriction requirement is made FINAL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 7, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,401,358 in view of Minton et al., U.S. Patent 5,883,005 and further in view of Hamamura et al., U.S. Patent 5,342,448.

Kadomura shows the invention substantially as claimed including an apparatus using a neutral beam, the apparatus comprising: a reaction chamber 20 having a stage 24 therein on which a substrate 7 is mounted; a neutral beam generator 21 for generating an argon neutral beam from a source gas to supply the neutral beam to the reaction chamber; an etching gas supply of diatomic chlorine for supplying an etching gas into the reaction chamber; and a purge gas supply for supplying a purge gas into the reaction chamber (see fig. 3 and col. 5-line 62 to col. 7-line 5).

Kadomura fails to expressly disclose a shutter disposed between the neutral beam generator and the reaction chamber, for controlling the supply of the neutral beam into the reaction chamber. Minton et al. discloses a shutter 20 disposed between the neutral beam generator and the reaction chamber, for controlling the supply of the neutral beam into the reaction chamber (see fig. 1 and col. 4-line 45 to col. 6-line 56). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura to include the shutter of Minton et al. because this allows for the screening out of unwanted products.

Kadomura and Minton et al. do not expressly disclose a controller for controlling the supply of the source gas, the etching gas, and the purge gas, and the opening and closing of the shutter. Hamamura et al. discloses the utilization of a controller 38 to control a gas controller 36 and shutter controller 37 (see figs. 1, 11A and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al. so as to include the controller of Hamamura et al. because this would allow for greater controllability over the processes performed within the apparatus.

Regarding the substrate being silicon, such limitation is directed to a method limitation instead of an apparatus limitation and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Kadomura modified by Minton et al. and Hamamura et al. is capable of processing a silicon substrate.

Claims 2-3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,401,358 in view of Minton et al., U.S. Patent 5,883,005 and Hamamura et al., U.S. Patent 5,342,448 as applied to claims 1, 7, and 17-18 above, and further in view of Asakawa et al., U.S. Patent 5,776,253.

Kadomura, Minton et al., and Hamamura et al. are applied as above but fail to expressly disclose a reflector positioned in a path of the ion beam accelerated from the ion source, for reflecting and neutralizing the ion beam and wherein the reflector is a plate shape and comprises one of a semiconductor substrate, a silicon dioxide, and a metal substrate. Asakawa et al. discloses the use of a plate-shape metal reflector positioned in the path of the beam for reflecting and neutralizing the beam (see col. 6-lines 32-40 and col. 27-lines 22-49). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al. and Hamamura et al. so as to provide the neutral generating portion with a reflector because as shown by Asakawa et al. this is a suitable structural arrangement in which to generate a neutral beam.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,401,358 in view of Minton et al., U.S. Patent 5,883,005 and Hamamura et al., U.S. Patent 5,342,448 and further in view of Asakawa et al., U.S. Patent 5,776,253 as applied to claims 2-3 and 5 above, and further in view of Fetzer et al., U.S. Patent 4,794,258.

Kadomura, Minton et al., Hamamura et al., and Asakawa et al. are applied as above but fail to expressly disclose wherein the reflector is tiltable to control an angle of incidence of the ion beam which is incident thereto. Fetzer et al. discloses an apparatus with a neutral beam that includes a reflector 12 which is tiltable to control an angle of incidence of the ion beam which is incident thereto (see fig. 1 and col. 5-lines 31-68). In

view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al., Hamamura et al., and Asakawa et al., so as to comprise a tiltable reflector, as taught by Fetzer et al., because this will allow for greater controllability of the neutral beam during processing.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,401,358 in view of Minton et al., U.S. Patent 5,883,005 and Hamamura et al., U.S. Patent 5,342,448 and further in view of Asakawa et al., U.S. Patent 5,776,253 as applied to claims 2-3 and 5 above, and further in view of Chen et al., U.S. Patent 6,331,701 or Löb, U.S. Patent 5,036,252.

Kadomura, Minton et al., Hamamura et al., and Asakawa et al. are applied as above but fail to expressly disclose that the ion source for the neutral beam is one of high density helicon plasma ion gun and an ICP-type ion gun. Chen et al. disclose an apparatus comprising a neutral beam source wherein the ion source is either a high density helicon plasma ion gun or an ICP-type ion gun (col. 3, lines 35-48). Also, Löb discloses an apparatus comprising an ion source having an ICP-type ion gun (fig. 1 and its description). Therefore, in view of these disclosures it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by Minton et al., Hamamura et al., and Asakawa et al., as to comprise one of a helicon plasma ion gun and an ICP-type ion gun as the ion

source, as taught by Chen et al. or Löb, because such ion sources are a suitable alternative to generate a source of particles for the neutral beam.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Luz L. Alejandro
Primary Examiner
Art Unit 1763

November 17, 2003